K. V. Krombein

ENTOMOLOGICAL NEWS

JUNE, 1938

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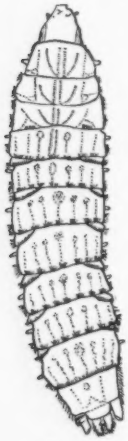
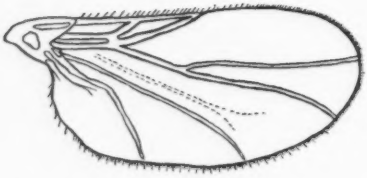


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.



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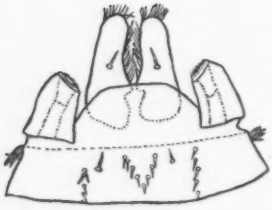

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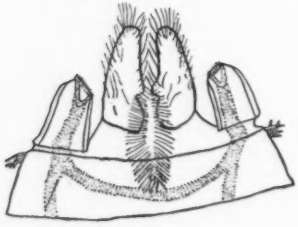

Fig. 7.

SCATOPSE (RHEGMOCLEMA) SIMILIS N. SP.—BEEKEY

ENTOMOLOGICAL NEWS

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The Immature and Adult Stages of a New Species of Scatopse from Maine. (Diptera: Scatopsidae).

By CYRUS E. BEEKEY.

(Plate IV.)

Some flies which differ from previously described species but closely resembling *S. subnitens* Verrall (= *nigra* (Mg.) Edw.) an European species, were submitted to me by Dr. O. A. Johannsen of Cornell University. The larvae and pupae were found beneath the loose bark of spruce logs, which were floating in the Penobscot River, in the vicinity of saw mills, at Orono, Maine, in October. They occurred just above the water line where they were kept moist by the capillary action.

Scatopse (Rhegmoclema) similis n. sp.

Larva. Head capsule strongly sclerotized, flattened dorso-ventrally, truncate, slightly longer than wide; surface generally smooth on top but laterally sculptured. Eyes absent. Antennae small, slender, with papillae-like blade or spike on the second segment (fig. 2). Labrum with groups of fine spines projecting from its under surface; premandibles with five distinct teeth, the fourth and fifth being finer and longer than the first three. Mandibles with four teeth in one plane, and one more proximad directed toward the others. The "leaf-like structure" found in some other species was not observed in *S. similis* but in its place were several long, stout bristles. Besides these there is a fringe of bristles extending about the distal third of the mandible on the dorso-lateral side. The maxilla is similar to that of other species, the distal lobes with blunt teeth.

Body composed of twelve segments, each of which, except the eleventh, more than twice as broad as long (fig. 1); dorsal side more strongly sclerotized than the ventral. First thoracic segment bears a lateral spiracle; first six abdominal segments are of uniform width; first abdominal segment apparently overlapping the third thoracic as well as the second abdominal, and somewhat bi-convex with reference to its anterior and pos-

terior margins. Each abdominal segment with a pair of lateral spiracles, except the eighth and ninth; those on the eighth abdominal segment project caudally, stout, and heavily sclerotized; ninth tergite projecting over the bases of stout caudal papillae (fig. 6).

The dorsal setae pattern of *S. similis* is quite characteristic (fig. 1). There is a median longitudinal row of bristles on all segments except eleven and twelve. This row is double on segments one to four inclusive and partly so on the fifth and sixth. On the thoracic segments there are two more rows of setae on each half; those next to the median row diverging anteriorly. The next row on the first two segments is almost parallel to the median row. It is joined by short, slightly curved, transverse rows. On the third segment the lateral longitudinal row also diverges from the posterior to the anterior margin. On segments four to ten inclusive, in addition to the median row, there are three rows in each dorsal half of a segment. Often the third row is considerably broken. These rows are nearly parallel with the median row. On the fourth segment the rows next to the median seem to have at their anterior ends small loops. These, although less regular, are found in a similar position on segments five to nine inclusive. On the sixth segment and those following, the median row of setae appears to have a small, more or less circular area of setae at the anterior end. The setae on the eleventh segment (fig. 6) roughly represent the letter "W" with the outer arms pointing anteriorly. The setae on this segment are longer and stronger than those previously described. On segments four to ten inclusive, there is, on the posterior border of each segment, a broken line of hairs connecting the posterior ends of the longitudinal row of bristles. This row is incomplete on the third segment. Segments five to ten inclusive also appear to have an anterior fold on the lateral margins of each segment. This is also lined with hairs slightly longer than the setae. Laterally, each segment except the first and last two, have two tufts of hairs, one anterior just in front of the spiracles, the other posterior. The first segment has the anterior lateral border margined with hairs and the eleventh segment has the entire lateral border thus margined, but with considerably longer hair. The setae, under very high magnification, appear like the teeth of a comb as there are often five or six very close together in a straight line. These are found especially on the median row, and on the lateral rows of the first four segments. Groups of fewer setae, of this type, are scattered without pattern on the ventral surface. The tubercles

of the posterior spiracles are stouter, and more heavily sclerotized than the caudal appendages. They are nearly parallel with them and bear only a few very tiny hairs, differing in this respect from some other described species, in which, the hairs are longer. In the larva of *S. atrata* described by Malloch in 1917 the spiracular tubercles appear on the dorsal side near the anterior border of the 12th segment. The caudal appendages in the latter species also appear on the dorsal side but near the posterior border of the 12th segment and diverge rather sharply. In the larva of *S. similis* the caudal appendages are slightly tapering, and covered at their tips and on their interior margins by very long hair. On the ventral surface the posterior spiracular tubercles clearly show the trachea entering them (fig. 7). There is a "V" shaped area on the eleventh and twelfth sternites which is bordered by a wide diffuse line of long hair. These hairs guard the anal opening. In other species this line is more regular. Length of full grown larva about 4.0 mm.

The *pupa* of *S. similis* is very similar to those of other members of the genus *Scatopse,* except in the structure of the prothoracic spiracular organs. The pupa forms within the last larval skin, and through this, one can observe on the ventral side, the sheaths for the appendages. On the dorsal side, however, projecting through the larval skin, in the third segment along the anterior margin, a pair of long "horn-like" processes break through. These are the prothoracic respiratory organs. In *S. subnitens* and also in *S. atrata* each of these organs bifurcates into equal parts about the middle of their length. The *S. similis* pupa as seen from some angles seems to have a straight unbranched organ, but, by turning it, one may notice a small branch near the middle containing a few tracheal openings (fig. 3). The remainder of the organ at its tip and on the distal half is closely covered by the spiracular openings, which appear as the ends of tiny tubes. Six pairs of lateral pupal respiratory processes are found which pierce the larval skin in the same line as the last abdominal pair. The pupal organs are longer than those of the larva.

♂ ♀. The adult of *S. similis* closely resembles that of *S. subnitens* Verr. except in a slight difference of wing structure. The wings of *S. subnitens* are described as being milky white. In *S. similis* they are transparent hyaline. The cubital veins more closely approach the wing margin in *S. similis* than in *S. subnitens.*

Length 2 mm. Head and body black, the latter glistening,

legs yellow to dark brown. Facets of eyes interspersed with short brown hairs. Antennae ten-segmented, slightly longer than the height of the head; distal segment is as long as the three adjacent segments; each segment bearing several bristles in addition to numerous fine hairs; the second segment longer than the first or third but of the same width as the remainder of the segments. Scutellum, black, with numerous yellow hair. Mesonotum very dark brown, glistening, with only a few hairs. Abdomen long and narrow, closely covered with a gray pubesence; slightly depressed dorsoventrally.

The male is easily distinguished by a somewhat pointed tergite at the tip of the abdomen. Beneath the claspers the last sternite projects in a rounded point (fig. 4). The female has light colored, haired lobes as in other species.

Wing (fig. 5) transparent hyaline; first three veins very heavy and black, ending at about the middle of the costal margin, the other veins very light in color; prefurca of median vein about one-half the length of either branch; first branch ends at the apex; both branches at first parallel but diverge rather sharply near the wing margin; first cubital vein extends beyond the half of the wing, where it suddenly bends toward the wing margin, but not quite attaining it; second cubital vein thick and strongly sinuous, having an arc of a small circle at its middle; second cubital vein, like the first, not quite reaching the wing margin and stopping abruptly very close to it; anal vein reduced. A pair of spurious veins appears between the media and cubitus, and after being closely parallel to the middle of the wing, diverge at an angle of about thirty degrees. Costal margin with stout bristles on the first two-thirds, beyond which point they gradually become finer, but interspersed with a few longer hairs beyond the point where the second branch of the media reaches the margin. Halteres very dark brown, almost black.

The adult *S. similis* most closely resembles *S. atrata* and *S. pygmaea* of the species previously described for North America, differing in the relative length of the prefurca. The prefurca in *S. atrata* is two-thirds of the length of the posterior branch of the median fork, in *S. similis* it is slightly less than half the length of the posterior fork, in *S. pygmaea* it is about one-fourth of the length of the posterior branch of the fork.

This is the unnamed species referred to by Johannsen in Aquatic Diptera, Part I, (Memoir 164, Cornell University Experiment Station, 1934, page 49).

Where and When to find the Orthoptera of Pennsylvania, with Notes on the Species Which in Distribution Reach Nearest This State.

By MORGAN HEBARD, Philadelphia, Pennsylvania.

(Continued from page 103.)

The following exotic species have been brought to Pennsylvania but can almost certainly not become established in this climate.

DERMAPTERA.

EUBORELLIA ANNULIPES (Lucas). Philadelphia, 1 ♂.

PROLABIA ARACHIDIS (Yersin). Dead in skin of bat in Philadelphia museum, 1 ♂, 2 juv.

ORTHOPTERA.

BLATTIDAE.

NEOBLATTELLA FRATERCULA (Saussure and Pictet). On ship at Philadelphia from Honduras, 1 ♂.

N. DETERSA (F. Walker). On ship at Philadelphia from Jamaica, 2 ♂, 5 ♀.

NYCTIBORA LAEVIGATA (Beauvois). On wharf at Philadelphia, 1 ♀. Harrisburg, 1 ♀.

EURYCOTIS DIMIDIATA (Bolivar). Berwick, 1 ♂.

NEOSTYLOPYGA RHOMBIFOLIA (Stoll). In package of tobacco from Sumatra at Reading, 1 ♀.

PANCHLORA CUBENSIS Saussure. In fruit at Philadelphia, 3 ♀.

LEUCOPHAEA MADERAE (Fabricius). In logwood on ship at Philadelphia from Jamaica, 1 large juv.

NAUPHOETA CINEREA Olivier. In onion leaves on ship at Philadelphia from Rhodesian cargo, 1 ♂, 2 ♀.

BLABERUS DISCOIDALIS Serville. In logwood on ship at Philadelphia from Jamaica, 1 ♂, 3 ♀.

The following species, not known from New Jersey or Pennsylvania, probably do not occur in the latter State but in distribution approach it relatively closely.

ACRIDIDAE.

SCHISTOCERCA OBSCURA (Fabricius). Dover, Delaware; Chestertown and Druid Hill Park in Baltimore, Maryland. In high rich vegetation in humid areas. Most adults in Fall.

PARATYLOTROPIDIA BEUTENMULLERI Morse. In southern valleys of Appalachian Mountains. Probably in thicket undergrowth. Adult probably in early Summer.

MELANOPLUS ACROPHILUS PACHYCERUS Hebard. Giles County, Virginia at 4000 feet. Probably in richer open forest undergrowth. Adult probably in early July.

PAROXYA HOOSIERI Blatchley. Lake and Portage Counties, Ohio (E. S. Thomas). In bogs. Adult in mid-July.

TETTIGONIIDAE.

MONTEZUMINA MODESTA (Brunner). Wingina, Virginia. In bushes and forest undergrowth. Adult probably in mid-July.

ATLANTICUS AMERICANUS HESPERUS Hebard. Berne Township in Fairfield County, Ohio (E. S. Thomas). In woodland undergrowth. Adult in early July.

GRYLLIDAE.

NEMOBIUS GRISEUS GRISEUS E. M. Walker. North Haven, Connecticut, and Lucas County, Ohio (E. S. Thomas). In sandy areas in open. Adult in mid-August.

N. CONFUSUS Blatchley. Plummers Island and Cabin John Run, Maryland. In bogs and swamps. Adult in mid-August.

CYRTOXIPHA COLUMBIANA Caudell. Washington, D. C. In the lower foliage of deciduous trees. Probably adult in early August.

The following species reach to or beyond New Jersey on the Atlantic Coast but in this latitude are not known, and the great majority certainly do not occur, inland as far as Pennsylvania.

DERMAPTERA.

PSALIDAE.

ANISOLABIS MARITIMA (Géné). Sea beaches from Maine to Florida. Adult at all seasons in the South.

ORTHOPTERA.

BLATTIDAE.

PARCOBLATTA FULVESCENS (Saussure and Zehntner). Coastal margin of Pine Barrens north to Lakehurst. Adult in mid-June.

P. CAUDELLI Hebard. Costal margin of Pine Barrens north to Wading River on Long Island, New York. Adult in mid-June.

P. LATA (Brunner). Ocean View, VII, 24 and VIII, 10, 1937, (H. Fox; taken in molasses jar trap set in woods) 3 ♀ 2 juv., [A.N.S.P. and Hebard Cln.]. A first record for New Jersey and a northern limital point.

ACRIDIDAE.

TETTIGIDEA ACUTA Morse. Salt marshes north to Morgan. Adult in Spring, Summer and Fall.

Although there is a recorded male of *Tettigidea prorsa* Scudder labelled Beach Haven, New Jersey in the Academy collection, it is apparent that some mistake in labelling may have occurred. The correct limit of known northeastern distribution may well be Fayetteville, North Carolina.

MERMIRIA INTERTEXTA Scudder. Bog areas and margins of tidal marshes north to Ocean City and Belleplain in southern New Jersey. Adult early in August.

ORPHULELLA OLIVACEA Morse. Salt marshes generally, north to New Haven, Connecticut. Adult in late June.

CLINOCEPHALUS ELEGANS Morse. Margins of salt marshes and bogs near coast north to Ravenswood on Long Island, New York. Adult in mid-July.

PARDALOPHORA PHOENICOPTERA (Burmeister). Sandy waste fields toward coast throughout New Jersey, north to Fort Wadsworth on Staten Island, New York. Adult in early June.

SPHARAGEMON SAXATILE Morse. On bare rock ledges southwest to Great Notch, Newfoundland and Ogdensburg in northeastern New Jersey. Adult in early July.

MELANOPLUS IMPUDICUS Scudder. Pine Barrens north to Selden on Long Island, New York. Berlin, New Jersey is the

eastern limit nearest Pennsylvania. Adult in early June.

M. STONEI Rehn. Even more local in Pine Barrens north to Lakehurst. Berlin is the eastern limit nearest Pennsylvania. Adult in late June.

DENDROTETTIX QUERCUS Packard. A unique relict or introduced. Present in northern Pine Barrens of New Jersey and north to Yaphank on Long Island, New York. On oaks, not infrequently defoliating these trees. Adult in mid-July.

PAROXYA ATLANTICA ATLANTICA Scudder. Edges of marshes on coast and in swamps and bogs of Pine Barrens north to Jamesburg and Lakehurst. Medford and Lindenwold are eastern limits nearest Pennsylvania. Adult in late June.

TETTIGONIIDAE.

MICROCENTRUM RETINERVE (Burmeister). In deciduous trees. North only to Manumuskin in southern New Jersey. Adult in mid-August.

NEOCONOCEPHALUS TRIOPS (Linnaeus). Through undergrowth. North only to Green Creek in extreme southern New Jersey. Adult in late August, so surviving and reappearing in early Spring in the South.

N. ROBUSTUS ROBUSTUS (Scudder). Sea beaches north to Cape Cod, Massachusetts. Adult in late July.

N. NEBRASCENSIS (Bruner). Ocean View. Otherwise known only from the middle west. Adult taken early in August.

ORCHELIMUM FIDICINIUM Rehn and Hebard. Salt marshes north to Rockaway on Long Island, New York and on Delaware Bay to Hancock's Bridge. Adult in mid-July.

O. MILITARE Rehn and Hebard. Speedwell, one very small male. Extremely rare so far north. Tall grasses in damp spots in pine woods and along borders of marshes and lakes. Adult taken in late August.

CONOCEPHALUS STICTOMERUS Rehn and Hebard. Fresh water marshes in southern New Jersey north only to Cedar Springs. Adult in early August.

C. AIGIALUS Rehn and Hebard. Northern limit Cape May (series secured last Fall by H. Fox). On damp soil in *Spartina patens*. Adult probably in early August.

C. NIGROPLEUROIDES (Fox). Salt marsh tidal flats north to Staten Island, New York, in *Spartina stricta* and *Spartina patens*. Adult in late July.

C. SPARTINAE (Fox). Salt marshes north to Old Orchard, Maine, in *Panicularia fluitans* and *Spartina patens*. Adult in late July.

GRYLLIDAE.

ANUROGRYLLUS MUTICUS (DeGeer). Coastal southern New Jersey north only to Ocean View. Adults present early in June.

NEMOBIUS CUBENSIS CUBENSIS Saussure. Coastal in marshes north to Staten Island, New York. Swainton and Cold Spring only New Jersey localities.

FALCICULA HEBARDI Rehn. Known only from Reega. A northern limit in the Pine Barrens. Adults taken in late July.

CYCLOPTILUM BIDENS Hebard. Coastal north to East Marion, Long Island, New York. Lakehurst, Margate City and Reega are the only New Jersey records. Adult in mid-August.

GRYLLOTALPA GRYLLOTALPA (Linnaeus). Introduced and established; in great numbers in nursery at Rutherford.

It will be noted how very much E. S. Thomas has helped me in defining limits of distribution. Through an unfortunate error the initials E. R. instead of E. S. Thomas were given on page 37. Under *Scudderia fasciata,* moreover, on page 33, I should have remarked that the specific status of that insect had been observed by E. S. Thomas from Ohio material and that he had communicated to me his findings.

Notes on the Synonymy and Distribution of some North American Bees of the Genus Bombomelecta (Hymenoptera).

By E. Gorton Linsley, University of California, Berkeley.

The bees of the genus *Bombomelecta,* although occasionally captured in numbers, are generally rather rare in collections. Little is known of the distribution or hosts of most of the species, and in several cases, sexual dimorphism has resulted in the giving of different specific names to the two sexes of a single species. The following notes and synonymy are based primarily on a study of the members of the genus in the collections of the Academy of Natural Sciences of Philadelphia, the California Academy of Sciences, and the Canadian National collection.

Bombomelecta fulvida (Cresson). This form has been variously treated by different authors as a distinct species or as a variety of *B. pacifica* Cresson or *B. thoracica* Cresson. The male genitalia indicate that its relationships are with *pacifica,* but the lobes of the stipites have a more slender, conical, apical process than in the latter type. At present our knowledge of the habits and distribution of the two forms is insufficient to indicate whether this difference is of specific or subspecific importance. *B. fulvida* has been recorded from Nevada (type locality), Colorado, Arizona, New Mexico, and British Columbia. Additional records are as follows: California: Truckee, June 13-15 (Van Duzee, C. A. S.), West Walker River, Mono Co., 7200 ft. (N. W. Frazier), Hackamore, Modoc Co., May 6 (Linsley); Oregon: Warner Mts., Lake Co., June 19 (Van Dyke, C. A. S.), Blitzen Valley, Harney Co., April 19 (S. G. Jewett), Stein Mts., Harney Co., June 25 (W. J. Chamberlin, C. A. S.), Melhorn's Mill, Baker Co., June 17 (W. J. Chamberlin, C. A. S.), Wild Horse Canyon, Steens Mts., July 5 (Scullen, C. A. S.), Meachim, June 23 (J. F. Bock, C. A. S.), Elgin, June 20, (A. L Lovett, C. A. S.); British Columbia: Penticton, April 25-30 (E. R. Buckell, Can.), Chilcotin, May 14 (Buckell, Can.), Salmon Arm, April 25, (T. Wilson, Can.), Vernon, May 25 (W. B. Anderson, Can.); Alberta: Medicine Hat, April 21 (Sladen, Can.); Utah: Mt. Carmel, near Zion Canyon, May 23, (Van

Dyke, C. A. S.); TEXAS: Davis Mts., July-August (Poling), Texas A. & M. College Insectary (C. A. S.)

BOMBOMELECTA LARREAE Cockerell.

Bombomelecta larreae Cockerell, 1900, Can. Ent. 32:51, ♀.

Bombomelecta azygos Viereck, 1903, Trans. Am. Ent. Soc. 29: 181, ♂, n. syn.

An examination of the type of *B. azygos* Viereck reveals the fact that it is the male of *B. larreae* Ckll. The two sexes are quite similar, but the male lacks the dense patch of golden hairs on the upper frons as well as the abdominal fasciae which are sometimes present in the female. The species has been previously known from New Mexico (*larreae*) and Nevada (*azygos*). In California, a series of both sexes was recently taken near the junction of Deep Creek and the Mojave River, Mojave Desert, San Bernardino Co., on April 26 (Linsley) and May 5 (Timberlake and Linsley), at flowers of *Eriodictyon trichocalyx*. Other records from the same State are: Borego Valley, San Diego County, May (H. S. Gentry, in coll. G. E. and R. M. Bohart); Wildrose Canyon, Panamint Mts., Inyo County, 3500 ft., May 28, on *Prosopis* (C. D. Michener); 5 mi. C. of Olancha, Inyo Co., May 19 (C. D. Michener); and Mountain Springs, Argus Mts., Inyo Co., 5000 ft., May 22, on *Stenotopsis linearifolia* and *Stanleya pinnata* (C. D. Michener).

BOMBOMELECTA EDWARDSI (Cresson).

Melecta edwardsi Cresson, 1878, Trans. Am. Ent. Soc. 7:92, ♂

Bombomelecta zygos Viereck, 1903, Trans. Am. Ent. Soc. 29:179, ♀

A study of the type of *B. zygos* Viereck confirms the suggestion of Dr. Cockerell[1] that it is the female of *B. edwardsi* Cresson. The two sexes have been taken together on numerous occasions at Antioch, Contra Costa Co., Calif.

BOMBOMELECTA PACIFICA Cresson. British Columbia records in the Canadian National Collection are as follows: Vernon (E. P. Venable), Penticton, April 10-15 (E. R. Buckell), Salmon Arm, April 25 (T. Wilson).

BOMBOMELECTA SEPARATA MACULATA Viereck. This race has been previously recorded from Utah, California, and

[1] Cockerell, T. D. A., 1925, Pan-Pac. Ent. 1:180.

Oregon. Material in the Canadian National Collection from British Columbia is as follows: Victoria, April 29 (R. C. Treherne), and Royal Oak, May 5 (R. C. Treherne).

Bibliographical and Synonymical Catalogue of Bombomelecta.

Genus BOMBOMELECTA Patton.

Bombomelecta Patton, 1879, Bull. U. S. Geol. Surv. 5:370. Cresson, 1887, Trans. Am. Ent. Soc. (suppl.) 128. Fox, 1893, Ent. News 4:144. Ashmead, 1899, Trans. Am. Ent. Soc. 26:66. Fowler, 1901, Univ. Calif. Exp. Sta. 2:326. Cockerell and Atkins, 1902, Ann. Mag. Nat. Hist. (7) 10:46. Cockerell, 1910, Ann. Mag. Nat. Hist. (8) 5:27. Cockerell. 1928, Univ. Colo. Studies 16:104.

Orthotype: *Melecta thoracica* Cresson.

ALFREDI Cockerell, 1895, Psyche (suppl.) 11, ♂. Cockerell, 1898, Bull. Lab. Den. Univ. 11:61, ♂. Viereck, 1903, Trans. Am. Ent. Soc. 29:179, ♂. N. Mex.

ARIZONICA Cockerell, 1902, Can. Ent. 34:267, ♀. Viereck, 1903, Trans. Am. Ent. Soc. 29:179, ♀. Ariz.

CALLURA Cockerell, 1926, Pan-Pac. Ent. 3:58, ♂. Calif.

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LARREAE Cockerell, 1900, Can. Ent. 32:361, ♀. Viereck, 1903, Trans. Am. Ent. Soc. 29:179, ♀. N. Mex., Nev., Calif.

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Some Dragonflies from the Florida Keys (Odonata).

By C. FRANCIS BYERS, University of Florida, Gainesville.

During the past year the writer has received two small collections of dragonflies from some of the islands or "keys" off the southern tip of peninsular Florida.

One of these collections, made by Mr. Frank N. Young on Virginia Key near Miami (Dade County, Florida), contained a male specimen of *Trapezostigma binotata* (Rambur)* captured June 18, 1937. Mr. Young reports that this specimen was taken flying against the wind along a canal and that capture was difficult due to the height and speed at which the dragonfly was flying. He also states that other representatives of the species were seen but not captured.

The other collection received was made by Mr. Jack C. Russell on Key West and the Dry Tortugas from July 2 to August 12, 1936.

The Dry Tortugas, southernmost part of the United States, consists of a group of small low lying keys located 65 miles from Key West and 125 miles west-southwest from Cape Sable,

* Syn. ad. *Tramea insularis* Hagen. The generic name *Tramea* Hagen, 1861, must be replaced by *Trapezostigma* Hagen, 1849, according to Mr. J. Cowley. (Nomenclature of Odonata: Three Generic Names of Hagen. The Entomologist, 68:283-284, December, 1935). Hagen's species *insularis* is a synonym of Rambur's *binotata*.

at the entrance to the Gulf of Mexico. The nearest mainland is Cape Sable; the island of Cuba at its nearest point is 90 miles distant; the coast of Yucatan is 350 miles to the southwest and 750 miles to the westward is the coast of Mexico.

Mr. Russell collected dragonflies on the following keys of the Tortugas group: Garden Key, the largest of the group on which Fort Jefferson is located; Loggerhead Key, the location of the lighthouse and the Marine Biological Laboratory of the Carnegie Institute of Washington; Bush Key and Sand Key.

Because of its interest to students of dragonfly distribution and to biologists concerned with the fauna of the Dry Tortugas, I append a complete list of Mr. Russell's dragonfly collection; the notes following the species are his.

CORYPHAESCHNA INGENS (Rambur). 1 ♀. Loggerhead Key, August 3, 10 P. M. Party cloudy with showers. Perched on limbs of bushes.

C. VIRENS (Rambur). 1 ♀. Bush Key, August 2, 6:30 P. M. Fair. Caught flying around a brackish water pool.

TRIACANTHAGYNA TRIFIDA (Rambur). 1 ♀. Loggerhead Key, August 3, 10 P. M. Partly cloudy with showers. Perched on limbs of bushes.

ANAX AMAZILI (Burmeister). 1 ♀. Garden Key, July 2. Fair. 1 ♂. Garden Key, July 16. At rest at night.

A. JUNIUS (Drury). 1 ♀. Loggerhead Key, July 30, 8:30 P. M. Windy and partly cloudy. Perched on limbs of bushes. 1 ♂; 2 ♀. Loggerhead Key, August 3, 10:00 P. M. Partly cloudy with showers. Perched on limbs of bushes.

CELITHEMIS EPONINA (Drury). 1 ♀. Garden Key, July 7.

ORTHEMIS FERRUGINEA (Fabricius). 3 ♀. Key West August 8-9, Mid-day. Fair. Flying around a fish pool.

ERYTHRODIPLAX BERENICE NAEVA (Hagen). 1 ♂. Garden Key, July 23. Windy and partly fair. Hanging around a slightly brackish pond—an enclosed place in the moat. 3 ♂; 1 ♀. Key West, August 7-8. Fair. Open grassy field. 1 ♂; 6 ♀. Key West, August 10. Hot and fair. Around brackish water.

E. UMBRATA (Linne). 2 ♀ (heterochromatic). Garden

Key, July 26. Flying after a storm. 1 ♂ ; 1 ♀ (homochromatic). Bush Key, July 27. Windy.

PACHYDIPLAX LONGIPENNIS (Burmeister). 1 ♂. Garden Key, July 26. Flying after a storm.

LEPTHEMIS VESICULOSA (Fabricius). 1 ♂. Loggerhead Key, July 30. Fair. 1 ♂. Key West, August 9. Mid-day. Fair. Around fish pool. 2 ♂. Key West, August 10. Hot and Fair. Around brackish water flats.

MACRODIPLAX BALTEATA (Hagen). 1 ♂ ; 1 ♀. Key West, August 10. Hot and Fair. Around brackish water flats.

TRAPEZOSTIGMA CAROLINA (Linne). (See foot note, page 163). 3 ♀. Garden Key, July 7.

PANATALA FLAVESCENS (Fabricius). 1 ♀. Garden Key, July 7. 1 ♀. Loggerhead Key, July 24. Fair. 2 ♂ ; 1 ♀. Garden Key, July 30. Early morning after a hard blow and rain.

P. HYMENAEA (Say). 2 ♀. Garden Key, July 7. 1 ♀. Garden Key, July 30. Early morning after a hard blow and rain.

ISCHNURA RAMBURII (Selys). 1 ♀. Sand Key, July 14. 2 ♂ ; 2 ♀. Bush Key, July 18. Fair. 2 ♂ ; 2 ♀. Bush Key, August 2. Fair. Flying around brackish water pool. 2 ♂ ; 3 ♀. Loggerhead Key, August 3. Hot and fair. Caught by sweeping in grassy field.

ANOMALAGRION HASTATUM (Say). 2 ♀. Loggerhead Key, July 30. 1 ♂ ; 1 ♀. Garden Key, August 2. Fair. Flying in Ft. Jefferson. 1 ♂ ; 2 ♀. Key West, August 12. Hot and fair. Open grassy fields.

Coryphaeschna virens, Anax amazili and *Trapezostigma binotata* are worthy of special note because either they are new additions to the Florida list of dragonflies or they substantiate literature records made so long ago as to be traditional. Also, it is of interest to point out the prevalence of the larger stronger flying dragonflies on the Dry Tortugas and the paucity of the damselfly fauna.

Five New Genera of Fossil Oestromuscaria. (Diptera).

By CHARLES H. T. TOWNSEND, S. Paulo, Brazil.

ADIPTERITES gen. nov.

Genotype, *Dipterites obovatus* Heer, Urwelt Schweiz, fig. 323 (1865). Maggot. Upper Miocene of Oeningen, Baden.

Length, 24 mm; width, 18 mm. Oval, showing 13 segments, venter of second to twelfth but especially second to tenth segments furnished with heavy armature and chitinized in what appear like segmental plates, dorsum unarmed. Evidently cuterebrid or hypodermatid stock, but unlike any form hitherto known.

COCKERELLITHA gen. nov.

Genotype, *Glossina osborni* Cockerell, Nature, April, 128 (1909). Fly. Miocene of Florissant, Colorado.

Length of body, 10-1/3 mm; wing, 7 mm. M2 not so strongly curved before R6 as in Paloestrus and the living glossinid genera, M3 axis at right angle to M2, being the opposite extreme in venation from Lithoglossina erected below.

LITHOGLOSSINA gen. nov.

Genotype, *Glossina armatipes* Cockerell, Pr. Biol. Soc. Wash., XXX, 19 (1917). Male fly. Miocene of Florissant, Colorado.

Length of abdomen, 6½ mm; wing, 7½ mm; hind femur, 4 mm; hind tibia, 3 mm. M3 strongly sinuate, its axis at 45° to M2. Hind femora and tibiae armed with row of strong bristles, hind metatarsi bearing 2 stout longitudinally striate spines. Quite in contrast to other glossinid genera, which show hind legs only faintly bristled and M3 only faintly sinuate.

ELECTROTACHINA gen. nov.

Genotype, **E. smithii** sp. nov. For new genus Muscidae aff. Tachina sp. F. Smith, Quart. Jn. Sc., V, 184, pl. 18, fig. 5 (1868). Fly Lower Oligocene of Baltic amber.

Length of body, 8 mm; wing, 7 mm. Body not stout. Wings much longer than abdomen, 5R apparently narrowly open or closed, M3 apparently nearer R6. Legs moderate length. Abdomen apparently ovate and rather deep. Probably exoristid or tachinid stock.

VINCULOMUSCA gen. nov.

Genotype, *Musca vinculata* Scudder, Bull. U. S. G. G. Sur.

Terr., III, 758 (1877); Tert. Ins. No. Am., 554, pl. 5, fig. 77 (1890). Maggot. White River. Eocene of Chagrin Valley, Colorado.

Length, 17 mm; width, 4½ mm. Stout subcylindric, venter with broad transverse micro spine bands best marked on fourth to ninth segments. Apparently exoristid or tachinid stock.

Notes on the Distribution of Vermileo in the United States and Mexico with a Description of a New Species. (Diptera: Rhagionidae).

By DONALD DELEON, Berkeley, California.

The genus *Vermileo*, or worm-lions as they are commonly called, includes a group of true flies of very remarkable habits. It seems, however, that both the latin name and the commonly used translated equivalent are misleading, for in habits they are not lion-like insects that feed on "worms" but "worms" or better maggots with the habit of preying on small arthropods that fall into their pits in the sand or dust. Their mode of life is quite similar to that of *Myrmeleon* which, as the name indicates, includes a group of predatory insects feeding chiefly on ants.

Wheeler[1] gives an account of the habits and distribution of all the known species of this genus and in addition a detailed study of the morphology of that common species of the Sierra Nevada Mountains, *V. comstocki Wh.* It was believed by Wheeler that this species was a mountain form and found only at elevations above 4000 feet. In April 1934 the writer reared specimens of this species from material collected in February in the Coast Range at Pinnacles National Monument at an elevation of about 1600 feet. The Pinnacles National Monument is near Hollister, California. On December 22, 1936, Ranger Powell of this monument sent in about a dozen more larvae from this locality. Three of these larvae pupated and transformed between February 2 and March 1, 1937.

[1] Wheeler, W. M. Demons of the dust. W. W. Norton, New York, 1930.

V. opacus (Coq.) which is treated by Leonard[2] as a species distinct from *comstocki* and by Wheeler, in the work cited above, as but tentatively distinct was collected in the larval stage in numbers at Zion National Park, Utah in March 1934. Specimens reared from this lot were compared with the two specimens in the Academy of Natural Sciences, Philadelphia by Mr. Cresson who determined them as *V. opacus*. This species, which hitherto has been known only from a specimen collected near Carson City, Nevada and from two specimens from Alamogordo, New Mexico, was found to be very common in parts of the Southwest. In addition to the Utah locality, adults have been reared from larvae collected in Mesa Verde National Park, Colorado and Bandelier National Monument, New Mexico. Larvae that were most probably this species were collected at Colorado National Monument, Colorado and near Glendale, Utah. None has been collected in Arizona though they have been searched for from Grand Canyon in the north to the Chiricahua Mountains in the south.

V. opacus is easily distinguished from *comstocki* by its lighter color and its highly polished mesonotum with its three dark brown, sclerotized stripes.

During a trip to Mexico in 1936, *Vermileo* larvae were collected on January 25 at La Gruta near the pyramids of San Juan Teotihuacan at an elevation of about 8000 feet; on February 4 near the village of Palo Blanco, Go. at an elevation of about 2200 feet and on the same day at the same elevation two miles north of the town of Chilpanzingo, Guerrero. Both of these towns are on the highway to Acapulco. The last lot of larvae was collected on February 5 just south of the divide on the road between Mexico D. F. and Cuernavaca, Mor. at an elevation of about 9500 feet.

Of the several dozen larvae which were brought back alive to Berkeley only two have so far been reared to adults. Both of these larvae were from the lot collected February 5. At the time of collection these larvae were of all sizes but most of

[2] Leonard, M. D. A revision of the dipterous family Rhagionidae in the United States and Canada. Amer. Ent. Soc. Mem. 7. Philadelphia, 1930.

them were about 16 mm in length. Many of the larger larvae were taken from pits no larger than pits from which larvae half their size were taken. The largest larvae, four of which pupated between April 13 and 23, 1936, did not increase in size before pupation. One of these pupae transformed between April 24 and 25. The remaining three pupae died. One more adult, a male, emerged between March 5 and July 2, 1937. The date of pupation for this specimen is not known.

At the time of writing this note (November 10, 1937), there are four larvae still alive. Three of these are from the lot collected from La Gruta and one from the lot collected near Palo Blanco.

The larvae have been fed chiefly on vestigial-winged *Drosophila* adults but they also accepted termite nymphs and adults, ants, and even *Lucilia* larvae. The ability of the larvae to go without food or moisture is rather remarkable. Although between April 26 and November 20, 1936 none of the larvae was fed, there was only a slight mortality. In fact mortality seemed to be greater during the period when they were regularly fed than when they were not fed. Another record of a long fast is that of a larva from Pinnacles National Monument which was not fed during the period between June 1934 and January 25, 1935 but which was apparently healthy when fed on the later date. Signs of cannibalism were observed in only one box where the larvae were rather perhaps too closely crowded. In attempts to secure pupation, the sand containing the larvae was heavily misted with water several times but the moistening of the sand apparently had no effect in hastening their development.

The two adults that were reared appear to be a new species. They are strikingly distinct from either of the two species in the United States and do not fit the description for *Arthrostylum* described by Williston from Mexico[3]. Williston in Biologia Centrali-Americana[4] lists his species as a synonym of Walker's *Pheneus tibialis* which was described from Jamaica.

[3] Williston, S. W. Kans. Uni. Quart. Vol. 4, p. 109. 1895. (*A fasci-pennis* n. sp.).

[4] Diptera Vol. 1, p. 264 of supplement. 1886-1901.

As pointed out by Wheeler (op. cit.), Williston's description of *fascipennis* does not fit the description for *tibialis*. His species is more closely allied to the new species described below.

Vermileo willetti n. sp.

Male.—Length, 8 mm with abdomen bent downward. If straightened out the length would be about 8.5 mm. Head: Front and face both grey-pollinose; eyes dichoptic, black, bare rather finely granular, inner margin of compound eyes along front nearly parallel up to vertex, ocelli set on a distinct prominence which is narrowed and shining behind and below, lateral ocelli closer to inner margin of compound eyes than the width of the anterior ocellus; antennae with first joint yellow, twice the length of the second which is slightly darker than the first, basal part of the third joint same color as the second, remainder of third joint and style dark brown, nearly black, the style becoming darker towards its extremity; occiput flat, same color as front and face, rather sparsely covered with slender, yellowish-brown bristles; mouthparts light yellow.

Thorax: Somewhat opaque; mesonotum brownish-yellow with three black, longitudinal stripes somewhat confluent posteriorly, the middle stripe undivided, extending to the anterior margin, the lateral stripes extending slightly more than three-fourths of the way to the anterior margin, area between stripes grey-pollinose; scutellum yellowish-brown, metanotum similar but with median part dark brown, this brown part wider posteriorly than anteriorly; meso- and sternopleura dark brown; basal part of pteropleura dark brown, remainder of pleura yellow-brown; pleura for the most part slightly pollinose.

Abdomen: Slender, narrowest at segments 4 and 5, shining, yellowish brown with caudal half of segments 2 to 6 black, segment 7 entirely black, the remaining segment and appendages opaque brown, segment 1 black along crescent-shaped posteriorly bent transverse ridge, segment 2 with rounded boss near dorsal caudal margin, segment 3 with less strongly pronounced boss in the same relative position.

Wings: Hyaline with infumated band extending from C at union of Sc with C more narrowly across wing to and along Cu_2 to wing margin; all of cells C_2 and Sc infumated but not as strongly as transverse band; tip of wing infumated in region of R_{2+3} and R_4 and R_5; cell M_1 acute at base, cell M_3 open; knobs of halteres and distal half of stem nearly black.

Legs: Fore-legs yellow, last four segments of tarsi dark, 1st tarsal segment intermediate in color; a single spur present at

distal end of tibia; mesothoracic legs similar to fore-legs but darker in color and two spurs at end of tibia; metathoracic legs much longer than others and darker, tibia nearly black except for extreme proximal end of which is yellowish, two spurs at distal end of tibia.

Described from one specimen reared from larva collected February 5, 1936 along the highway about halfway between Mexico D. F. and Cuernavaca, Morelos. Emerged between March 5 and July 2, 1937.

Female.—Length 7 mm, the abdomen is bent down rather strongly; if straightened out the length would be at least 8 mm; similar to male but more robust and coloration uniformly lighter; inner margin of compound eyes along front more distinctly divergent towards the apex, lateral ocelli scarcely more distant from inner margin of compound eyes than the width of the anterior ocellus; mesothorax with longitudinal stripes wider, sides parallel and no tendency towards posterior confluency, lateral stripes lighter in color than median stripe; metanotum without darker median area; abdomen robust, dark yellow-brown, segments scarcely lighter anteriorly; hind tarsi and distal end of tibiae yellow; infumation of wings similar to but not as pronounced as in male.

Described from one female collected as larva same date and locality as male but which emerged between April 24 and 25, 1936. The tip of the right wing is broken.

Type: Male; both type and allotype are being retained in the author's collection under the collection number 680.

Named after C. R. Willette of Yosemite National Park who first found the pits of this species.

This species seems to be allied to *V. fascipennis* (Will.) but differs from it by the front and face being grey-pollinose whereas the front of *fascipennis* is brown and the face opaque yellow; by the first two joints of the antennae being yellow, while in *fascipennis* they both are partly black; by the pleura being yellow-brown instead of black; and by the abdomen having five transverse yellowish bands instead of being reddish and without any bands.

Acknowledgements are made to Mr. E. T. Cresson Jr., who kindly compared the material sent to him with the specimens in the Academy of Natural Sciences and to Dr. Nathan Banks who compared the male of the species described above with *V. tibialis* and *V. tibalis* var. *dowi* Wh. in the Museum of Comparative Zoology at Harvard.

List of Titles of Publications Referred to by Numbers in Entomological Literature in Entomological News.

1. Transactions of The American Entomological Society. Philadelphia.
2. Entomologische Blätter, red. v. H. Eckstein etc. Berlin.
3. Annales Sci. Naturelles, Zoologie, Paris.
4. Canadian Entomologist. London, Canada.
5. Pysche, A Journal of Entomology. Boston, Mass.
6. Journal of the New York Entomological Society. New York.
7. Annals of the Entomological Society of America. Columbus, Ohio.
8. Entomologists' Monthly Magazine. London.
9. The Entomologist. London.
10. Proceedings of the Ent. Soc. of Washington. Washington, D. C.
11. Deutsche entomologische Zeitschrift. Berlin.
12. Journal of Economic Entomology, Geneva, N. Y.
13. Journal of Entomology and Zoology. Claremont, Cal.
14. Archivos do Instituto Biologico, Sao Paulo.
15. Annales Academia Brasileira de Sciencias. Rio de Janeiro.
17. Entomologische Rundschau. Stuttgart, Germany.
18. Entomologische Zeitschrift. Frankfurt-M.
19. Bulletin of the Brooklyn Entomological Society. Brooklyn, N. Y.
20. Societas entomologica. Stuttgart, Germany.
21. The Entomologists' Record and Journal of Variation. London.
22. Bulletin of Entomological Research. London.
23. Bollettino del Lab. di Zool. gen. e agraria della Portici. Italy.
24. Annales de la société entomologique de France. Paris.
25. Bulletin de la société entomologique de France. Paris.
27. Bolletino della Societa Entomologica Italiana. Genova.
28. Ent. Tidskrift utgifen af Ent. Föreningen i Stockholm. Sweden.
29. Annual Report of the Ent. Society of Ontario. Toronto, Canada.
30. Archivos do Instituto de Biologia Vegetal, R. d. Janeiro.
31. Nature. London.
32. Boletim do Museu Nacional do Rio de Janiero. Brazil.
33. Bull. et Annales de la Société entomologique de Belgique. Bruxelles.
34. Zoologischer Anzeiger, hrsg. v. E. Korschelt. Leipzig.
35. The Annals of Applied Biology. Cambridge, England.
36. Trans. Royal Entomological Society, London. England.
37. Proceedings of the Hawaiian Entomological Society. Honolulu.
38. Bull. of the Southern California Academy of Sciences. Los Angeles.
39. The Florida Entomologist. Gainesville, Fla.
40. American Museum Novitates. New York.
41. Mitteilungen der schweiz. ent. Gesellschaft. Schaffhausen, Switzerland.
42. The Journal of Experimental Zoology. Philadelphia.
43. Ohio Journal of Sciences. Columbus, Ohio.
44. Revista chileña de historia natural. Valparaiso, Chile.
45. Zeitschrift für wissenschaftliche Insektenbiologie. Berlin.
46. Zeitschrift für Morphologie und Ökologie der Tiere. Berlin.
47. Journal of Agricultural Research. Washington, D. C.
49. Entomologische Mitteilungen. Berlin.
50. Proceedings of the U. S. National Museum. Washington, D. C.
51. Notulae entomologicae, ed. Soc. ent. Helsingfors. Helsingfors, Finland.
52. Archiv für Naturgeschichte, hrsg. v. E. Strand. Berlin.
53. Quarterly Journal of Microscopical Science. London.
54. Annales de Parasitologie Humaine et Compareé. Paris.
55. Pan-Pacific Entomologist. San Francisco, Cal.

56. "Konowia". Zeit. für systematische Insektenkunde. Wien, Austria.
57. La Feuille des Naturalistes. Paris.
58. Entomologische Berichten. Nederlandsche ent. Ver. Amsterdam.
59. Encyclopédie entomologique, ed. P. Lechevalier. Paris.
60. Stettiner entomologische Zeitung. Stettin, Germany.
61. Proceedings of the California Academy of Sciences. San Francisco.
62. Bulletin of the American Museum of Natural History. New York.
63. Deutsche entomologische Zeitschrift "Iris". Dresden.
64. Zeitschrift des österr. entomologen-Vereines. Wien.
65. Zeitschrift für angewandte Entomologie, hrsg. K. Escherich. Berlin.
66. Report of the Proceedings of the Entomological Meeting. Pusa, India.
67. University of California Publications, Entomology. Berkeley, Cal.
68. Science. New York.
69. Physis. Revista Soc. Argentina Cien. Nat. Buenos Aires.
70. Entomologica Americana, Brooklyn Entomological Society. Brooklyn.
71. Novitates Zoologicae. Tring, England.
72. Revue russe d'Entomologie. Leningrad, USSR.
73. Mem. Instituto Butantan. Sao Paulo, Brazil.
74. Sbornik entomolog. národniho musea v Praze. Prague, Czechoslovakia.
75. Annals and Magazine of Natural History. London.
77. Comptes rendus heb. des séances et mémo. de la soc. de biologie. Paris.
78. Bulletin Biologique de la France et de la Belgique. Paris.
79. Koleopterologische Rundschau. Wien.
80. Lepidopterologische Rundschau, hrsg. Adolf Hoffmann. Wien.
82. Bulletin, Division of the Natural History Survey. Urbana, Illinois.
83. Arkiv för zoologie, K. Svenska Vetenskapsakademien i. Stockholm.
84. Ecology. Brooklyn.
85. Genetics. Princeton, New Jersey.
87. Archiv für Entwicklungs mechanik der Organ., hrsg. v. Roux. Leipzig.
88. Die Naturwissenschaften, hrsg. A. Berliner. Berlin.
89. Zoologische Jahrbücher, hrsg. v. Spengel. Jena, Germany.
90. The American Naturalist. Garrison-on-Hudson, New York.
91. Journal of the Washington Academy of Sciences. Washington, D. C.
92. Biological Bulletin. Wood's Hole, Massachusetts.
93. Proceedings of the Zoological Society of London. England.
94. Zeitschrift für wissenschaftliche Zoologie. Leipzig.
95. Proceedings of the Biological Soc. of Washington, Washington, D. C.
97. Biologisches Zentralblatt. Leipzig.
98. Le Naturaliste Canadien. Cap Rouge, Chicoutimi, Quebec.
99. Mélanges exotico-entomologiques, Par Maurice Pic. Moulins, France.
100. Bulletin Intern., Acad. Polonaise Sci. et Lett. Cracovie.
101. Tijdschrift voor entomologie. Nederland. Ent. Ver., Amsterdam.
102. Entomologiske Meddelelser, Entomologisk Forening, Copenhagen.
103. Journal of the Kansas Entomological Society, Lawrence, Kansas.
104. Revista de la Sociedad entomologica Argentina, Buenos Aires.
105. Revista Entomologia, Sao Paulo, Brazil.
106. Anales Sociedad Cientifica Argentina, Buenos Aires.
107. Proc., Royal Entomological Society, London.
108. Revista, Col. Nac. Vicente Rocafuerte, Guayaquil.
109. Arbeiten uber morpholog. und taxonom. ent. aus Berlin-Dahlem.
110. Arbeiten ueber physiolog. u. angewandte ent. aus Berlin-Dahlem.
111. Memorias do Instituto Oswaldo Cruz. Rio de Janeiro.
112. Anales del Instituto de Biologia Mexico.
113. Entomologische Beihefte aus Berlin Dahlem.
114. Occasional Papers of the Museum of Zoology, University of Michigan.
115. Memorias de la Soc. Cubana de Hist. Nat. Havana, Cuba.
116. Parasitology. Ed. Keilin and Hindle. London.

Current Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, Jr.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the current or last year unless otherwise noted. All continued papers, with few exceptions, are recorded only at their first installment.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

Note. References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of Entomological News for 10c. The number of, or annual volume, and in some cases the part, heft, &c., the latter within ( ) follows; then the pagination follows the colon :

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The Late Samuel E. Cassino and The Naturalists' Directory

We regret to announce the death of Mr. Samuel E. Cassino on the 16th of November, 1937, at the age of 83 years. During his life he published 30 editions of the Naturalists' Directory and up to a few weeks of the end he was working on the 31st edition which he had expected to publish about this time.

It is planned by the writer to finish his work on this edition and publish it as soon as possible but the actual date is problematical as there is a great deal of work that must be finished before the Directory can be completed.

EST. OF SAMUEL E. CASSINO.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Wanted—North American Chrysididae for exchange or determination, with privilege of retaining duplicates. W. G. Bodenstein, Department of Entomology, Cornell University, Ithaca, New York.

Wanted—Chloropidae (Oscinidae) of the world. Study, determination or exchange. C. W. Sabrosky, Entomology Dept., Michigan State College, East Lansing, Mich.

Wanted—Heliconia from various parts of Mexico, Central and South America, especially Bolivia. Buy or exchange. F. E. Church, 15 West 67th St., New York, N. Y.

Wanted—Chrysalids of Papilio ajax and philenor, cocoons of Rothschildia orizaba and jorulla. Buy or exchange. Newark Entomological Society. Curator, Chas. Rummel, Green Village Rd., R. D. 2, Madison, New Jersey.

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